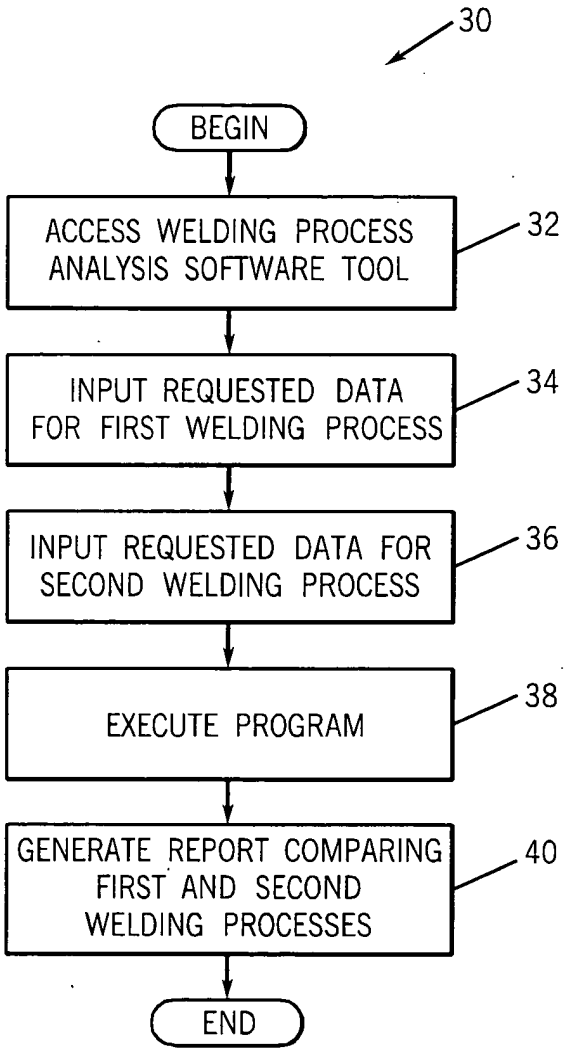

30
BEGIN
ACCESS WELDING PROCESS ANALYSIS SOFTWARE TOOL
32
INPUT REQUESTED DATA FOR FIRST WELDING PROCESS
34
INPUT REQUESTED DATA FOR SECOND WELDING PROCESS
36
EXECUTE PROGRAM
38
GENERATE REPORT COMPARING FIRST AND SECOND WELDING PROCESSES
40
END

FIG. 1

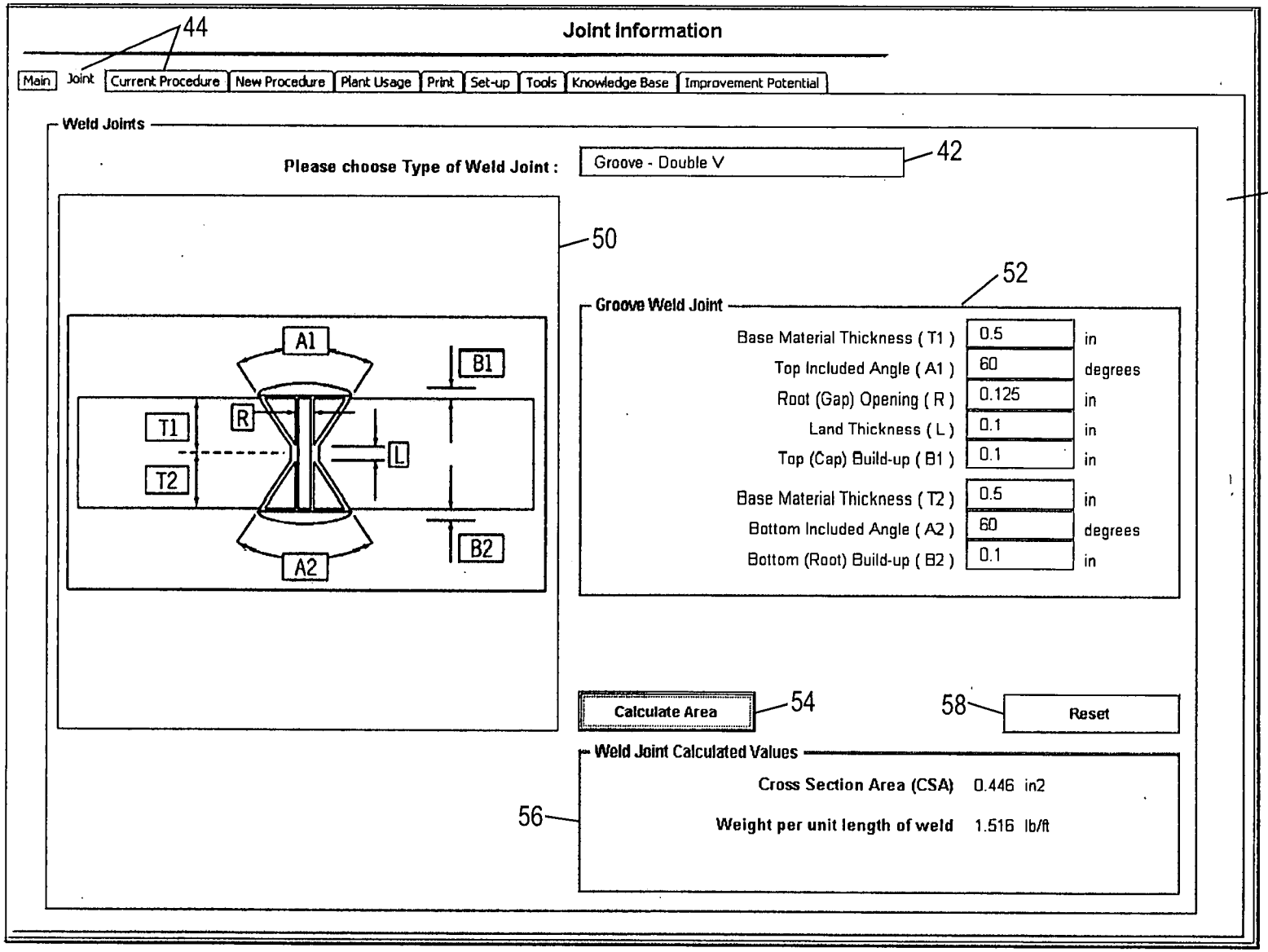

Joint Information
44
Main
Joint
Current Procedure
New Procedure
Plant Usage
Print
Set-up
Tools
Knowledge Base
Improvement Potential
Weld Joints
Please choose Type of Weld Joint :
Groove - Double V
42
46
50
52
A1
B1
T1
R
L
T2
A2
B2
Groove Weld Joint
Base Material Thickness (T1) 0.5 in
Top Included Angle (A1) 60 degrees
Root (Gap) Opening (R) 0.125 in
Land Thickness (L) 0.1 in
Top (Cap) Build-up (B1) 0.1 in
Base Material Thickness (T2) 0.5 in
Bottom Included Angle (A2) 60 degrees
Bottom (Root) Build-up (B2) 0.1 in
Calculate Area
54
58
Reset
Weld Joint Calculated Values
56
Cross Section Area (CSA) 0.446 in2
Weight per unit length of weld 1.516 lb/ft

FIG. 2

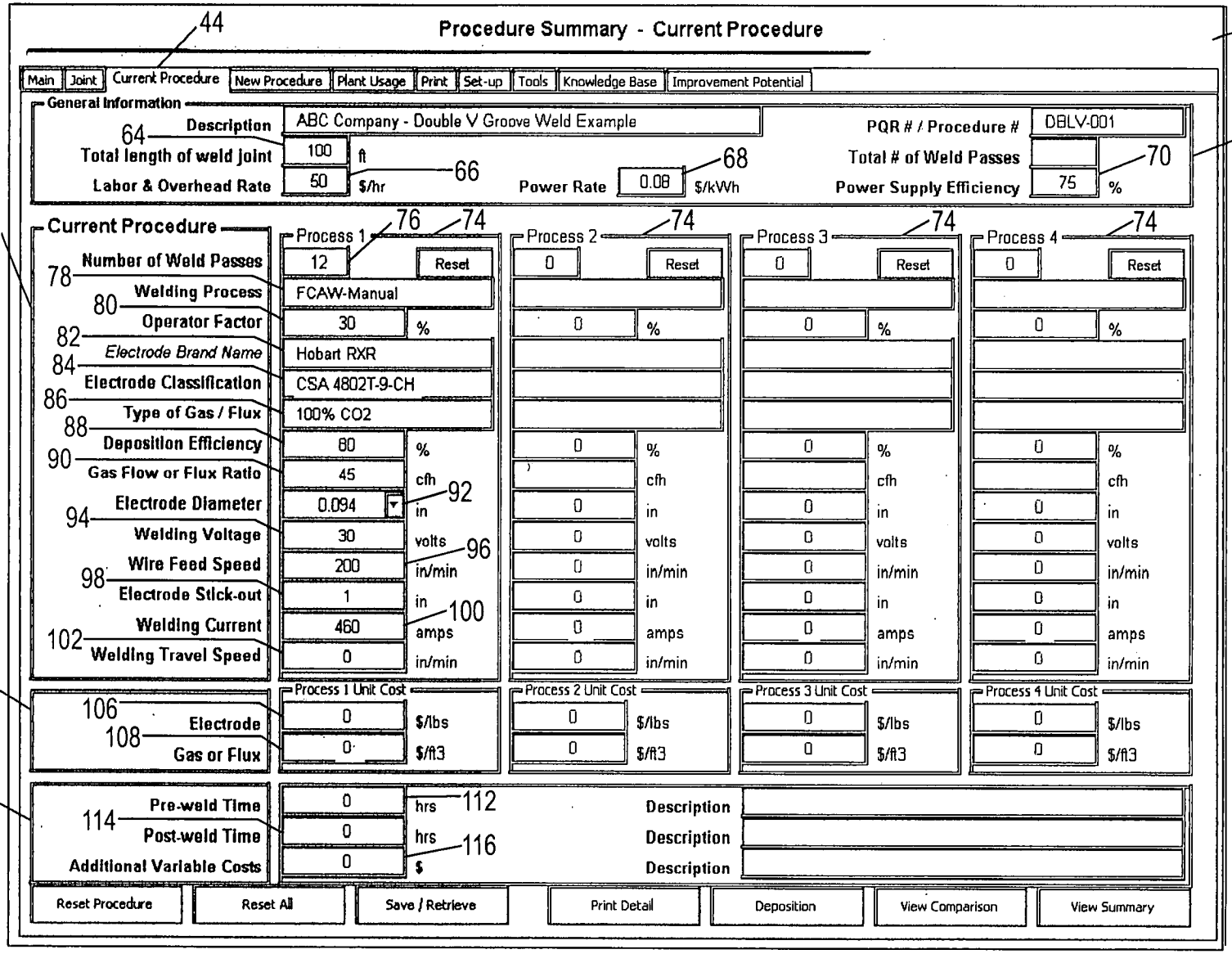

Procedure Summary - Current Procedure
44
60
Main
Joint
Current Procedure
New Procedure
Plant Usage
Print
Set-up
Tools
Knowledge Base
Improvement Potential
General Information
Description
ABC Company - Double V Groove Weld Example
PQR # / Procedure #
DBLV-001
64
Total length of weld joint
100
ft
62
Labor & Overhead Rate
50
$/hr
66
Power Rate
0.08
$/kWh
68
Total # of Weld Passes
70
Power Supply Efficiency
75
%
72
Current Procedure
Process 1
76
74
Process 2
Process 3
Process 4
Reset
Number of Weld Passes
78
12
0
Welding Process
80
FCAW-Manual
Operator Factor
82
30
%
Electrode Brand Name
84
Hobart RXR
Electrode Classification
86
CSA 4802T-9-CH
Type of Gas / Flux
88
100% CO2
Deposition Efficiency
90
80
Gas Flow or Flux Ratio
45
cfh
Electrode Diameter
92
0.094
in
94
Welding Voltage
30
volts
Wire Feed Speed
96
200
in/min
98
Electrode Stick-out
1
100
Welding Current
460
amps
102
Welding Travel Speed
0
in/min
104
Process 1 Unit Cost
Process 2 Unit Cost
Process 3 Unit Cost
Process 4 Unit Cost
106
Electrode
$/lbs
108
Gas or Flux
$/ft3
110
Pre-weld Time
112
Post-weld Time
114
Additional Variable Costs
116
hrs
$
Description
Reset Procedure
Reset All
Save / Retrieve
Print Detail
Deposition
View Comparison
View Summary
42
3 / 20

FIG. 3

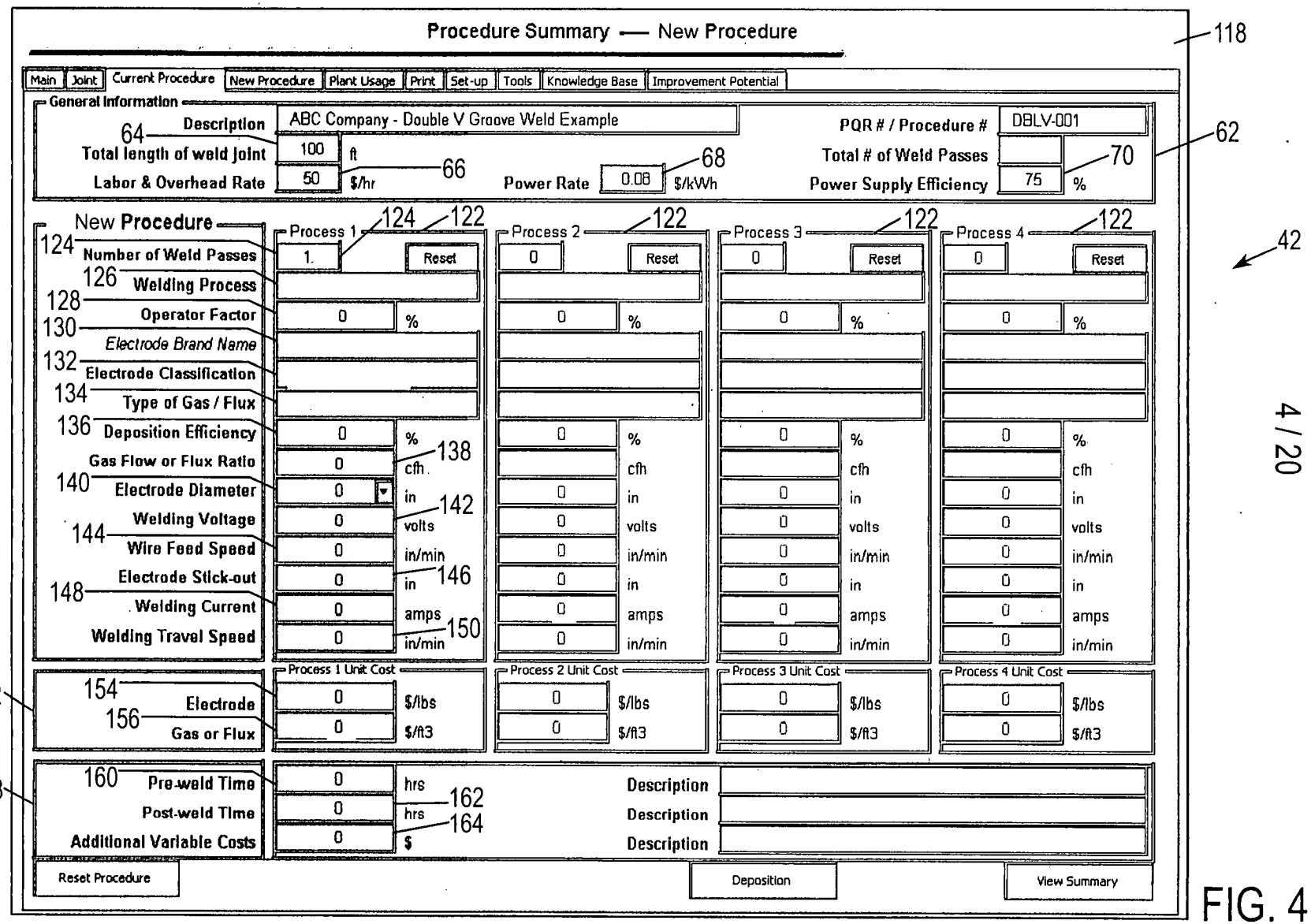

Procedure Summary — New Procedure
118
Main
Joint
Current Procedure
New Procedure
Plant Usage
Print
Set-up
Tools
Knowledge Base
Improvement Potential
General Information
64
Description
ABC Company - Double V Groove Weld Example
PQR # / Procedure #
DBLV-001
Total length of weld joint
100
ft
Total # of Weld Passes
62
Labor & Overhead Rate
50
$/hr
66
Power Rate
0.08
68
$/kWh
Power Supply Efficiency
75
70
%
New Procedure
Process 1
124
122
Process 2
Process 3
Process 4
Reset
Number of Weld Passes
126
Welding Process
128
Operator Factor
130
Electrode Brand Name
132
Electrode Classification
134
Type of Gas / Flux
136
Deposition Efficiency
Gas Flow or Flux Ratio
138
140
Electrode Diameter
142
Welding Voltage
144
Wire Feed Speed
Electrode Stick-out
146
148
Welding Current
Welding Travel Speed
150
42
4 / 20
Process 1 Unit Cost
Process 2 Unit Cost
Process 3 Unit Cost
Process 4 Unit Cost
152
154
Electrode
156
Gas or Flux
$/lbs
$/ft3
158
160
Pre-weld Time
Post-weld Time
162
Additional Variable Costs
164
hrs
$
Description
Reset Procedure
Deposition
View Summary

FIG. 4

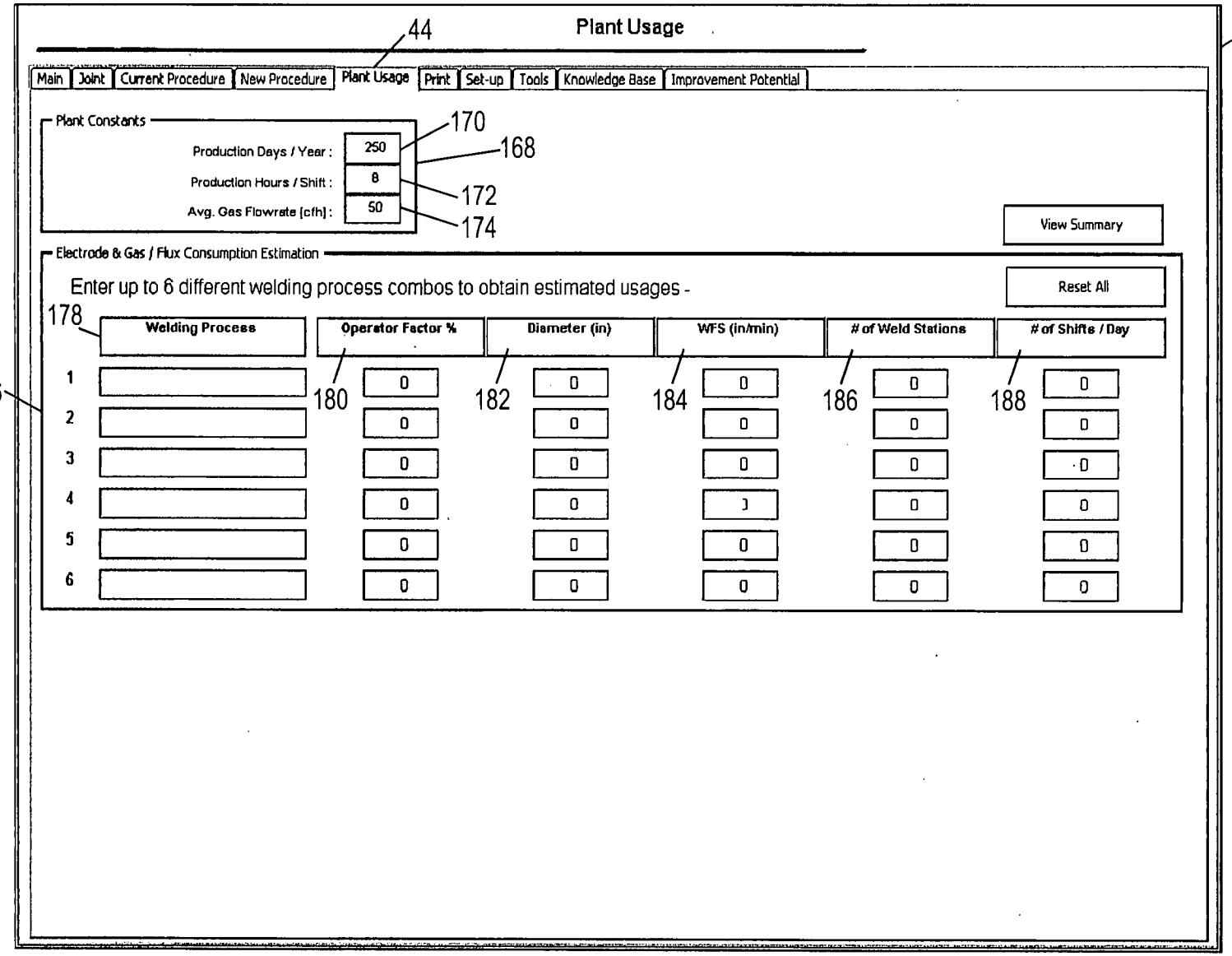

Plant Usage
44
166
Main
Joint
Current Procedure
New Procedure
Plant Usage
Print
Set-up
Tools
Knowledge Base
Improvement Potential
Plant Constants
Production Days / Year :
250
Production Hours / Shift :
8
Avg. Gas Flowrate [cfh] :
50
170
168
172
174
View Summary
Electrode & Gas / Flux Consumption Estimation
Enter up to 6 different welding process combos to obtain estimated usages -
Reset All
178
Welding Process
Operator Factor %
Diameter (in)
WFS (in/min)
# of Weld Stations
# of Shifts / Day
176
180
182
184
186
188
42
1
2
3
4
5
6

FIG. 5

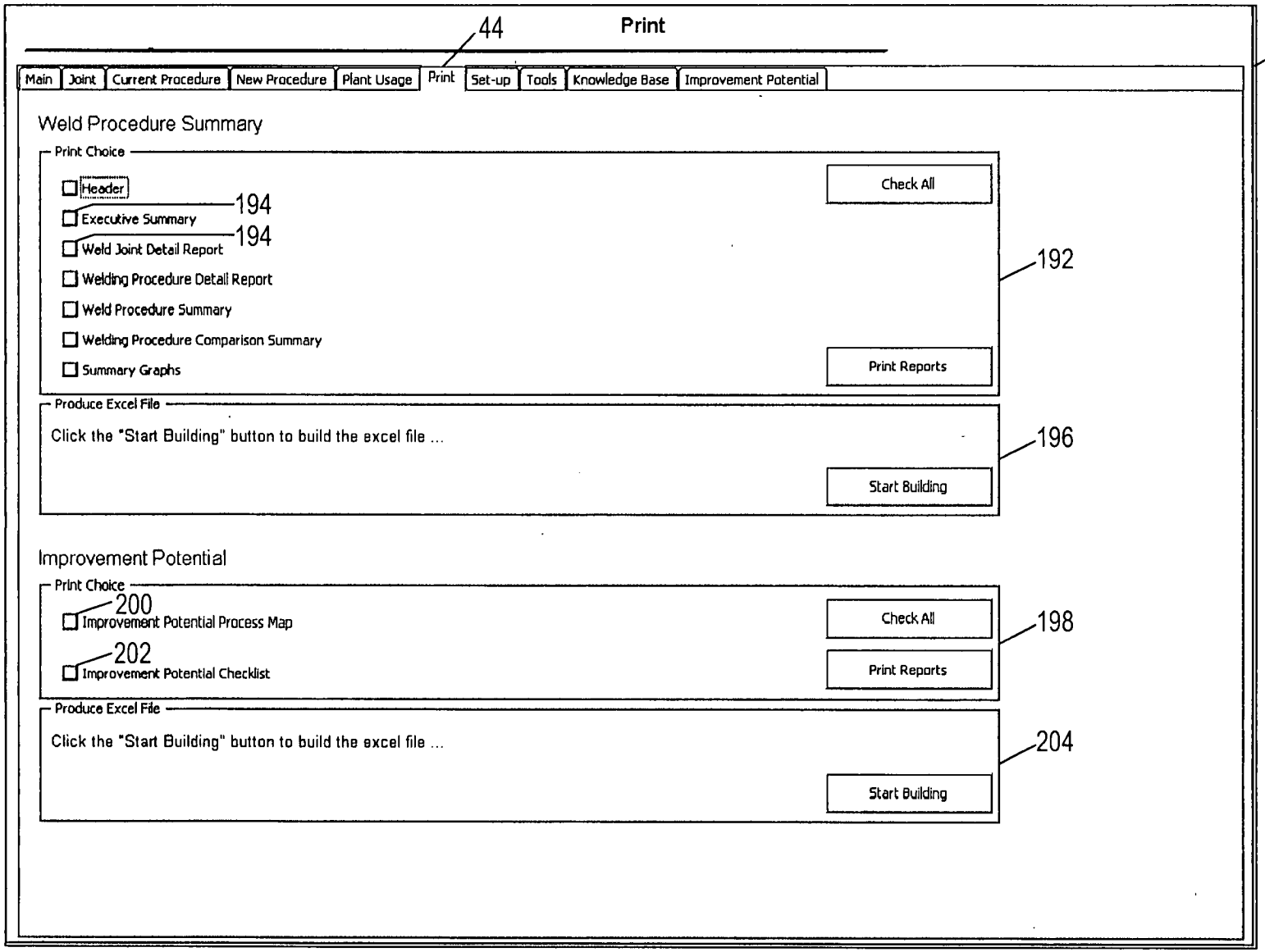

Print
44
190
Main
Joint
Current Procedure
New Procedure
Plant Usage
Print
Set-up
Tools
Knowledge Base
Improvement Potential
Weld Procedure Summary
Print Choice
Header
Executive Summary
Weld Joint Detail Report
Welding Procedure Detail Report
Weld Procedure Summary
Welding Procedure Comparison Summary
Summary Graphs
Check All
Print Reports
194
194
192
Produce Excel File
Click the "Start Building" button to build the excel file ...
Start Building
196
42
Improvement Potential
Print Choice
Improvement Potential Process Map
Improvement Potential Checklist
Check All
Print Reports
200
202
198
Produce Excel File
Click the "Start Building" button to build the excel file ...
Start Building
204

FIG. 6

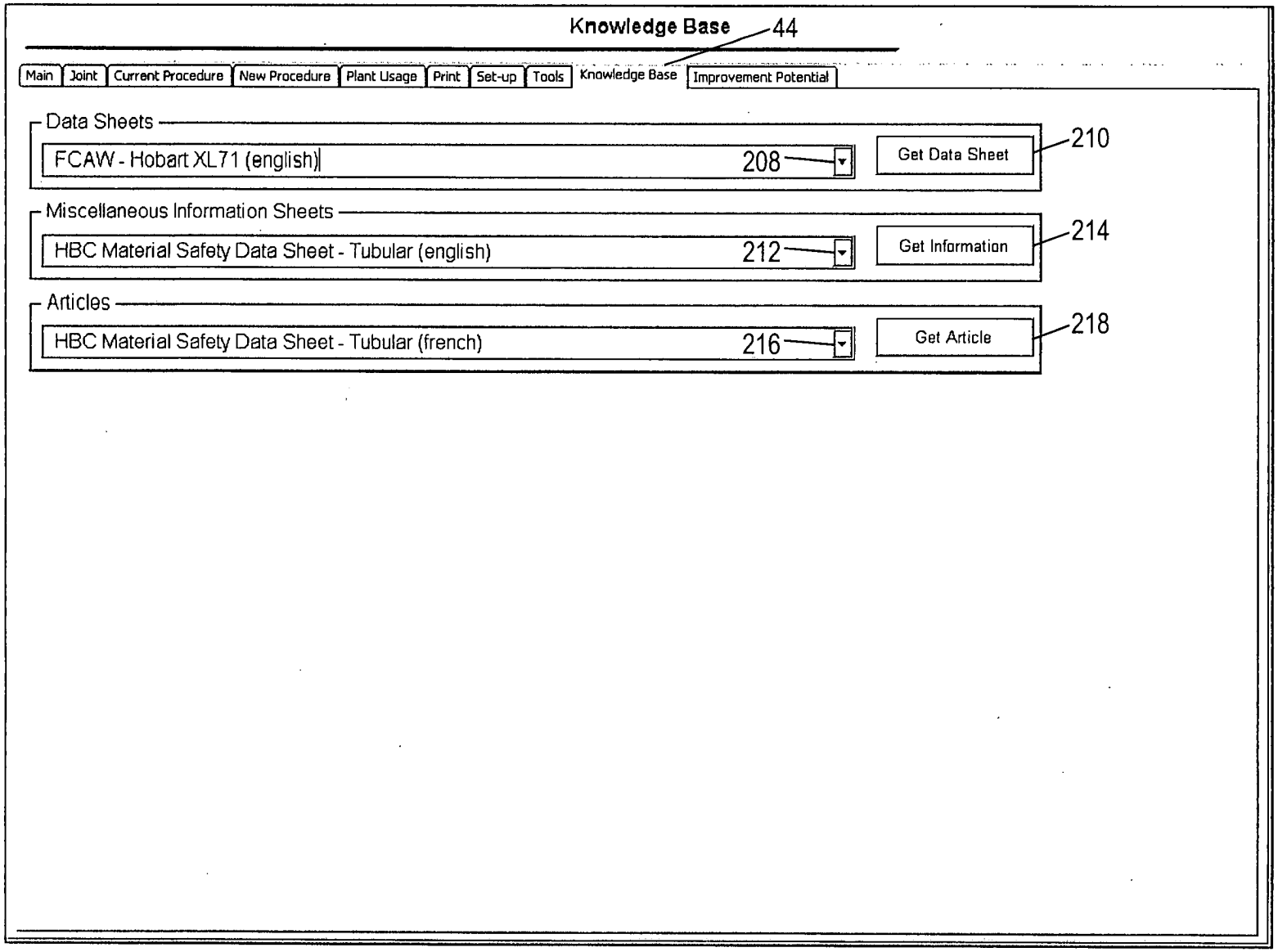

Knowledge Base
44
Main
Joint
Current Procedure
New Procedure
Plant Usage
Print
Set-up
Tools
Knowledge Base
Improvement Potential
Data Sheets
FCAW - Hobart XL71 (english)
208
Get Data Sheet
210
Miscellaneous Information Sheets
HBC Material Safety Data Sheet - Tubular (english)
212
Get Information
214
Articles
HBC Material Safety Data Sheet - Tubular (french)
216
Get Article
218
42

FIG. 7

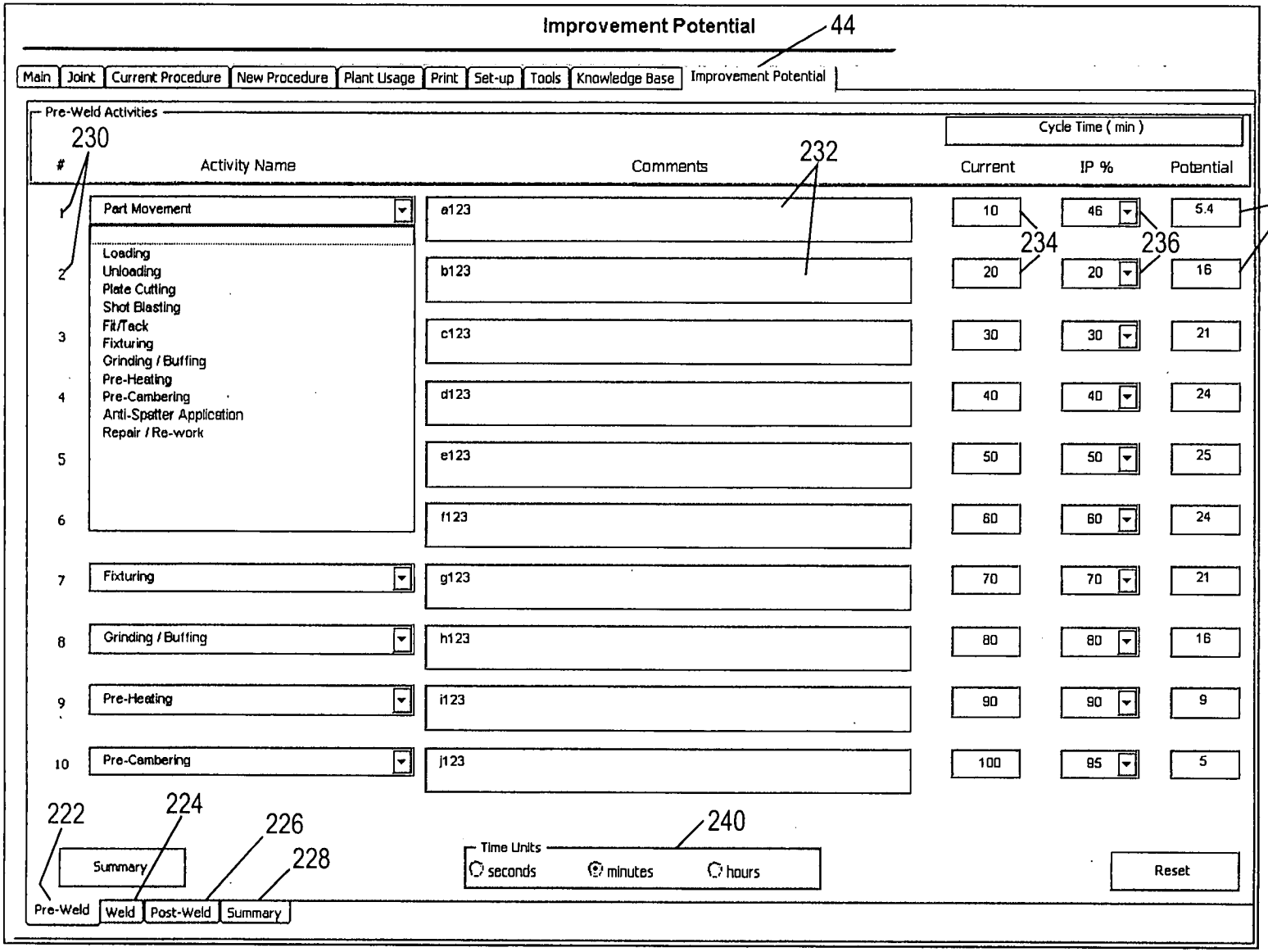
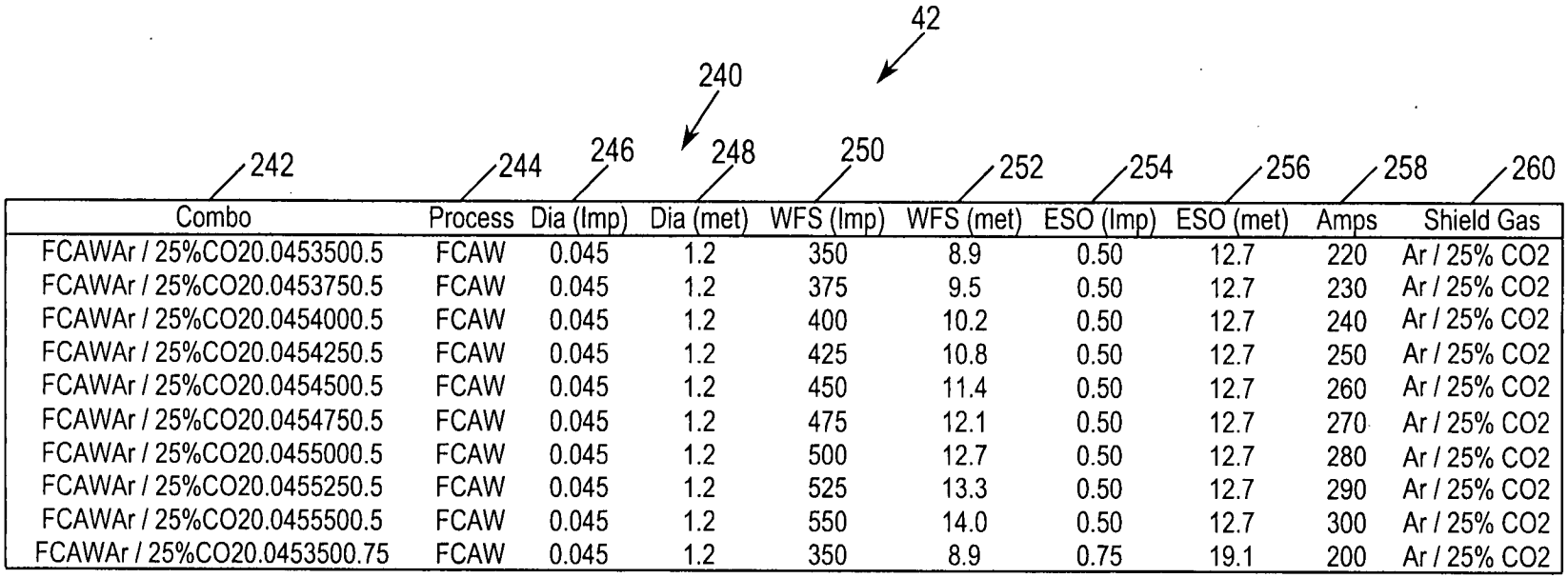

Improvement Potential
44
Main
Joint
Current Procedure
New Procedure
Plant Usage
Print
Set-up
Tools
Knowledge Base
Improvement Potential
Pre-Weld Activities
Cycle Time (min)
230
#
Activity Name
Comments
232
Current
IP %
Potential
238
234
236
1
Part Movement
a123
10
46
5.4
2
Loading
Unloading
Plate Cutting
Shot Blasting
Fit/Tack
Fixturing
Grinding / Buffing
Pre-Heating
Pre-Cambering
Anti-Spatter Application
Repair / Re-work
b123
20
20
16
3
c123
30
30
21
4
d123
40
40
24
5
e123
50
50
25
6
f123
60
60
24
7
Fixturing
g123
70
70
21
8
Grinding / Buffing
h123
80
80
16
9
Pre-Heating
i123
90
90
9
10
Pre-Cambering
j123
100
95
5
42
222
224
226
228
240
Summary
Time Units
seconds
minutes
hours
Reset
Pre-Weld
Weld
Post-Weld
Summary

FIG. 8



Combo	Process	Dia (Imp)	Dia (met)	WFS (Imp)	WFS (met)	ESO (Imp)	ESO (met)	Amps	Shield Gas
FCAWAr / 25%CO20.0453500.5	FCAW	0.045	1.2	350	8.9	0.50	12.7	220	Ar / 25% CO2
FCAWAr / 25%CO20.0453750.5	FCAW	0.045	1.2	375	9.5	0.50	12.7	230	Ar / 25% CO2
FCAWAr / 25%CO20.0454000.5	FCAW	0.045	1.2	400	10.2	0.50	12.7	240	Ar / 25% CO2
FCAWAr / 25%CO20.0454250.5	FCAW	0.045	1.2	425	10.8	0.50	12.7	250	Ar / 25% CO2
FCAWAr / 25%CO20.0454500.5	FCAW	0.045	1.2	450	11.4	0.50	12.7	260	Ar / 25% CO2
FCAWAr / 25%CO20.0454750.5	FCAW	0.045	1.2	475	12.1	0.50	12.7	270	Ar / 25% CO2
FCAWAr / 25%CO20.0455000.5	FCAW	0.045	1.2	500	12.7	0.50	12.7	280	Ar / 25% CO2
FCAWAr / 25%CO20.0455250.5	FCAW	0.045	1.2	525	13.3	0.50	12.7	290	Ar / 25% CO2
FCAWAr / 25%CO20.0455500.5	FCAW	0.045	1.2	550	14.0	0.50	12.7	300	Ar / 25% CO2
FCAWAr / 25%CO20.0453500.75	FCAW	0.045	1.2	350	8.9	0.75	19.1	200	Ar / 25% CO2

FIG. 9

264	266	268	270	272	274	276	278	280	282
Note : Ensure consumable name matches tab A consumable name.					Recommended Parameters - Imperial		Recommended Parameters - Metric		
Combo	Consumable Name	Diameter (Imp)	Diameter (Metric)	Voltage	WFS	ESO	WFS	ESO	Current
Hobart Fabcor 96Ar / 15% CO20.045	Hobart Fabcor 96	0.045	1.2	26.0	575	0.50	14.6	12.7	300
Hobart Fabcor 96Ar / 15% CO20.052	Hobart Fabcor 96	0.052	1.4	27.5	400	0.75	10.2	19.1	320
Hobart Fabcor 96Ar / 15% CO20.062	Hobart Fabcor 96	0.062	1.6	28.0	325	0.75	8.3	19.1	400
Hobart XL-71Ar / 25%CO20.045	Hobart XL-71	0.045	1.2	27.5	525	0.50	13.3	12.7	290
Hobart XL-71Ar / 25%CO20.052	Hobart XL-71	0.052	1.4	25.5	450	0.75	11.4	19.1	305
Hobart XL-71Ar / 25%CO20.062	Hobart XL-71	0.062	1.6	27.0	275	0.75	7.0	19.1	375
Hobart FabDual T91MAr / 25%CO20.045	Hobart FabDual T91M	0.045	1.2	25.0	450	0.50	11.4	12.7	275
Hobart FabDual T91MAr / 25%CO20.052	Hobart FabDual T91M	0.052	1.4	26.0	350	0.63	8.9	16.0	325
Hobart FabDual T91MAr / 25%CO20.062	Hobart FabDual T91M	0.062	1.6	27.0	275	0.75	7.0	19.1	375
Hobart RXR100% CO20.062	Hobart RXR	0.062	1.6	28.0	275	0.75	7.0	19.1	375
Hobart RXR100% CO20.078	Hobart RXR	0.078	2.0	29.0	250	1.00	6.4	25.4	425
Hobart RXR100% CO20.094	Hobart RXR	0.094	2.4	30.0	200	1.00	5.1	25.4	475
Eclipse RXR-XLS100% CO20.062	Eclipse RXR-XLS	0.062	1.6	28.0	275	0.75	7.0	19.1	375
Eclipse RXR-XLS100% CO20.078	Eclipse RXR-XLS	0.078	2.0	29.0	250	1.00	6.4	25.4	425
Eclipse RXR-XLS100% CO20.094	Eclipse RXR-XLS	0.094	2.4	30.0	200	1.00	5.1	25.4	475
Hobart FabDual T9M100% CO20.062	Hobart FabDual T9M	0.062	1.6	28.0	275	0.75	7.0	19.1	375
Hobart FabDual T9M100% CO20.078	Hobart FabDual T9M	0.078	2.0	29.0	250	1.00	6.4	25.4	425
Hobart FabDual T9M100% CO20.094	Hobart FabDual T9M	0.094	2.4	30.0	200	1.00	5.1	25.4	475
BR-6Ar / 8-10% CO20.052	BR-6	0.052	1.4	28.0	425	0.50	10.8	12.7	290

FIG. 10

Key Account Management (KAM) Summary Report 284

FIG. 11

Executive Summary

We have performed a process analysis of the following weldment :

Description : ***TANK END WELDS AND SEAM***

PQR # / Procedure # : ***test***

We have determined that a number of cost and quality drivers should be evaluated

- ***Total metal deposited : to evaluate any overweld / underweld conditions***
- ***Total cycle time (including pre-weld, post-weld, and welding time) : to evaluate plant capacity increase potential***
- ***Heat input analysis : to determine if distortion reduction potential is possible***
- ***Total process cost : to determine if a new process will reduce to the total process cost***

Our analysis highlights the following opportunities for improvement :

Total Metal Deposited

Our analysis indicates that the net difference of total metal deposited between the current procedure and the new procedure is approximately : [0 lbs [0 %]] 286

**** The new procedure is producing a weld deposit which matches that required by the joint dimensions***

***** The original procedure is producing a weld deposit which matches that required by the joint dimensions***

Total Cycle Time

Our analysis indicates the potential capacity that may be available by converting to the new process will be approximately : [2.64 hrs [54.5 %] per weld joint] 288

**** The new procedure provides the opportunity to increase throughput***

Heat Input Analysis

Our analysis indicates that the total heat input difference between the current process and the new process is approximately : [5.74 kJ/in [30 %]] 290

**** The new procedure provides the opportunity to reduce overall heat input (reduce distortion)***

Total Process Cost

Our analysis indicates that the total process cost difference between the current process and the new process is approximately : [$ 162.5 [54.1 %] per weld joint] 292

The new procedure provides significant reductions (greater than 10%) in the following areas :

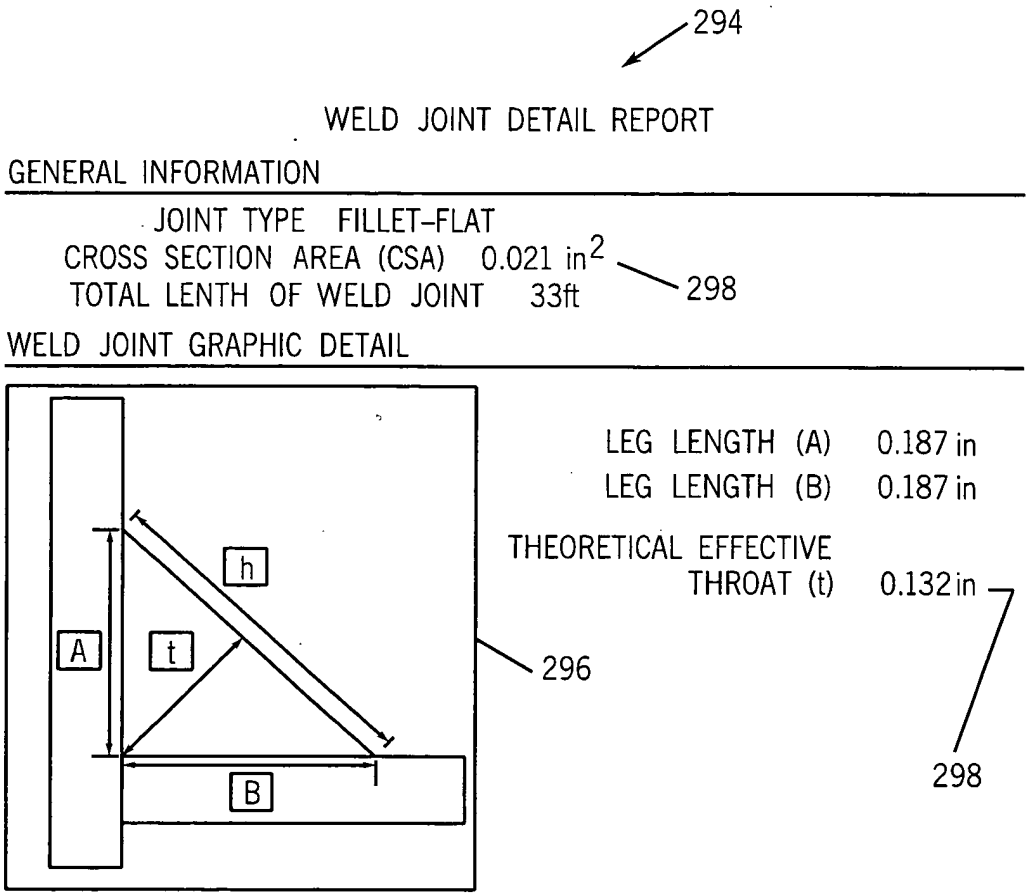

294
WELD JOINT DETAIL REPORT
GENERAL INFORMATION
JOINT TYPE FILLET-FLAT
CROSS SECTION AREA (CSA) 0.021 in2
TOTAL LENTH OF WELD JOINT 33ft
298
WELD JOINT GRAPHIC DETAIL
h
A
t
B
296
LEG LENGTH (A) 0.187 in
LEG LENGTH (B) 0.187 in
THEORETICAL EFFECTIVE THROAT (t) 0.132 in
298

FIG. 12

FIG. 13

300

Welding Procedure Detail Report

General Information

Description	TANK END WELDS AND SEAM
PQR # / Procedure #	test
Total length of weld joint	33 ft
Labor & Overhead Rate	60 $/hr
Power Rate	0.08 $/kWh
Power Supply Efficiency	75 %

Welding Procedure Detail

Current Procedure

Total # of Weld Passes: 1

72

	Process 1			
Procedure Variables Information				
Number of Weld Passes	1			
Welding Process	MCAW-Manual			
Operating Factor [%]	30			
Electrode Brand Name	Custom - MCAW			
Electrode Classification	CSA E4801C-6-CH			
Type of Shielding Gas	Ar / 8-10% CO2			
Gas Flow Rate [cfh]	40			
Deposition Efficiency [%]	91			
Electrode Diameter [in]	0.045			
Welding Voltage [volts]	28.0			
Wire Feed Speed [in/min]	300			
Electrode Stick-out [in]	0.50			
Welding Current [amps]	195			
Welding Travel Speed [in/min]	18.88			
Theoretical Deposition Rate [lbs/hr]	7.45			
Actual Deposition Rate [lbs/hr]	2.03			
Consumable Cost Information				
Electrode Cost [$/lbs]	2.00			
Shielding Gas Cost [$/ft3]	0.10			

302

104

Additional Information

Pre-weld Time [hrs]	2.08	Description *see IP TAB*
Post-weld Time [hrs]	1.60	Description *see IP TAB*
Additional Variable Costs [$]	3.00	Description *grinding disks,spatter spray*

110

New Procedure

Total # of Weld Passes: 1

120

	Process 1			
Procedure Variables Information				
Number of Weld Passes	1			
Welding Process	MCAW-Manual			
Operating Factor [%]	30			
Electrode Brand Name	Corex 6XC			
Electrode Classification	CSA E4801C-6-CH			
Type of Shielding Gas	Ar / 2-5% O2			
Gas Flow Rate [cfh]	40			
Deposition Efficiency [%]	97			
Electrode Diameter [in]	0.052			
Welding Voltage [volts]	26.0			
Wire Feed Speed [in/min]	450			
Electrode Stick-out [in]	0.75			
Welding Current [amps]	300			
Welding Travel Speed [in/min]	40.31			
Theoretical Deposition Rate [lbs/hr]	14.93			
Actual Deposition Rate [lbs/hr]	4.34			
Consumable Cost Information				
Electrode Cost [$/lbs]	2.00			
Shielding Gas Cost [$/ft3]	0.10			

304

152

Additional Information

Pre-weld Time [hrs]	1.66	Description *see IP TAB*
Post-weld Time [hrs]		Description *see IP TAB*
Additional Variable Costs [$]		Description *see IP TAB*

158

Note : Numbers shown on this report are estimates only, any changes will modify the results

FIG. 14

Weld Procedure Summary 306

Customer

Weld Metal Deposition Summary

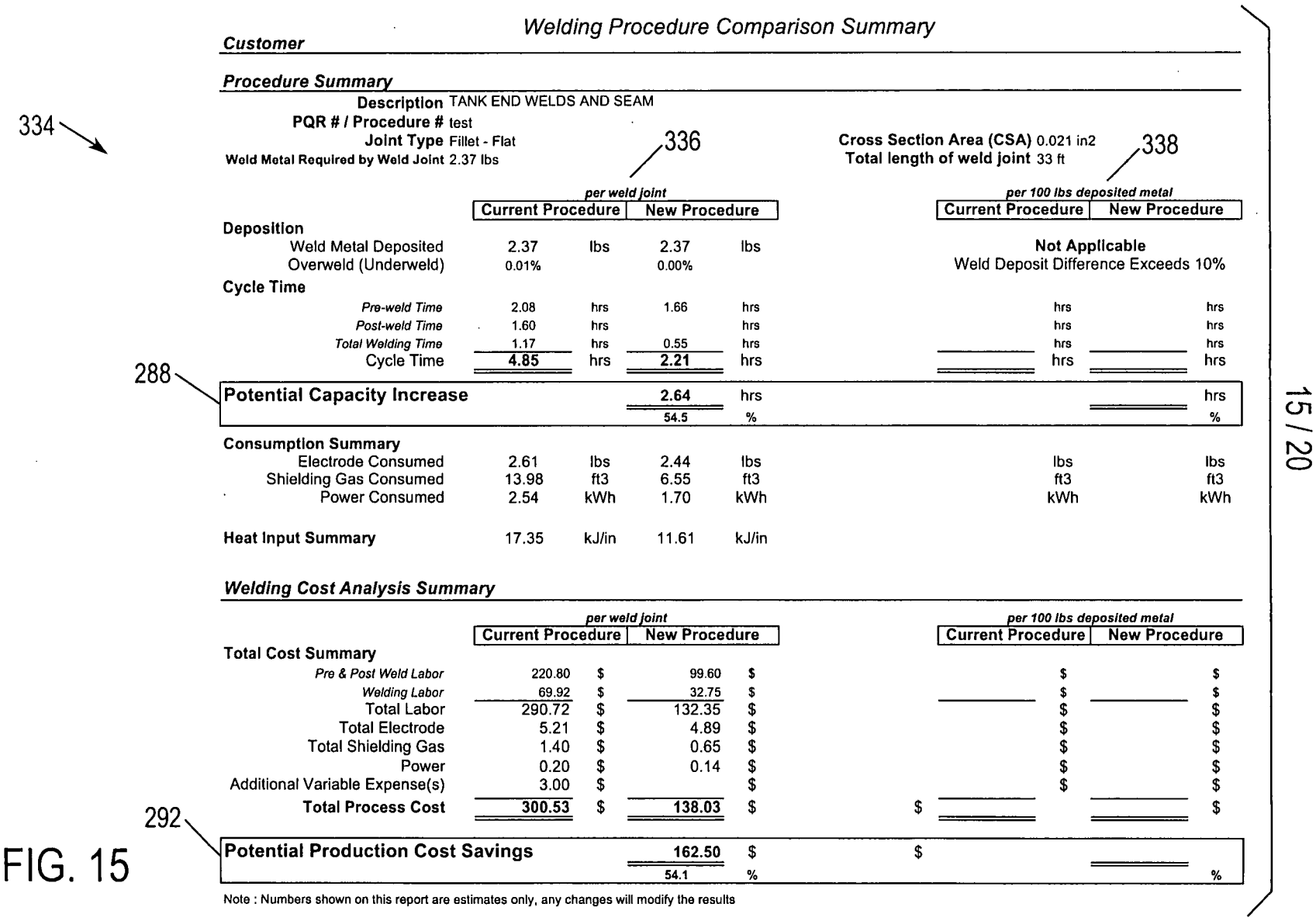
Joint Information

Joint Type	Fillet - Flat
Total length of weld joint	33 ft

Cross Section Area (CSA) 0.021 in2

Current Procedure	**Total**		***New Procedure***	**Total**	
Weld Metal Deposited [lbs]	2.37	308	Weld Metal Deposited [lbs]	2.37	
Weld Metal Required by Weld Joint [lbs]	2.37		Weld Metal Required by Weld Joint [lbs]	2.37	322
Overweld (Underweld)	0.0%		Overweld (Underweld)	0.0%	
Cycle Time			**Cycle Time**		
Pre-weld Time [hrs]	2.08		*Pre-weld Time [hrs]*	1.66	324
Post-weld Time [hrs]	1.60	310	*Post-weld Time [hrs]*		
Total Welding Time [hrs]	1.17		*Total Welding Time [hrs]*	0.55	
Cycle Time [hrs]	**4.85**		Cycle Time [hrs]	**2.21**	
Heat Input Summary			**Heat Input Summary**		
Heat Input [kJ/in]	17.4	312	Heat Input [kJ/in]	11.6	326
Weld Consumable Usage Summary			**Weld Consumable Usage Summary**		
Electrode Consumed [lbs]	2.61		Electrode Consumed [lbs]	2.44	
Shielding Gas Consumed [ft3]	13.98	314	Shielding Gas Consumed [ft3]	6.55	328
Power Consumed [kWh]	2.54		Power Consumed [kWh]	1.70	
Procedure Cost			**Procedure Cost**		
Pre & Post Weld Labor [$]	220.80		Pre & Post Weld Labor [$]	99.60	
Welding Labor [$]	69.92		Welding Labor [$]	32.75	
Total Electrode [$]	5.21	316	Total Electrode [$]	4.89	330
Total Shielding Gas [$]	1.40		Total Shielding Gas [$]	0.65	
Power [$]	0.20		Power [$]	0.14	
Additional Variable Expense(s) [$]	3.00		Additional Variable Expense(s) [$]		
Procedure / Process Total Cost	**$300.53**	320	**Procedure / Process Total Cost**	**$138.03**	332

Note : Numbers shown on this report are estimates only, any changes will modify the results



Welding Procedure Comparison Summary

Customer

Procedure Summary

334

Description TANK END WELDS AND SEAM
PQR # / Procedure # test
Joint Type Fillet - Flat
Weld Metal Required by Weld Joint 2.37 lbs

Cross Section Area (CSA) 0.021 in2
Total length of weld joint 33 ft

336 — *per weld joint*: Current Procedure | New Procedure

338 — *per 100 lbs deposited metal*: Current Procedure | New Procedure

	Current Procedure		New Procedure		per 100 lbs deposited metal: Current Procedure		per 100 lbs deposited metal: New Procedure	
Deposition								
Weld Metal Deposited	2.37	lbs	2.37	lbs	**Not Applicable**			
Overweld (Underweld)	0.01%		0.00%		Weld Deposit Difference Exceeds 10%			
Cycle Time								
Pre-weld Time	2.08	hrs	1.66	hrs		hrs		hrs
Post-weld Time	1.60	hrs		hrs		hrs		hrs
Total Welding Time	1.17	hrs	0.55	hrs		hrs		hrs
Cycle Time	**4.85**	hrs	**2.21**	hrs		hrs		hrs
288 **Potential Capacity Increase**			**2.64**	hrs				hrs
			54.5	%				%
Consumption Summary								
Electrode Consumed	2.61	lbs	2.44	lbs		lbs		lbs
Shielding Gas Consumed	13.98	ft3	6.55	ft3		ft3		ft3
Power Consumed	2.54	kWh	1.70	kWh		kWh		kWh
Heat Input Summary	17.35	kJ/in	11.61	kJ/in				

Welding Cost Analysis Summary

	Current Procedure		New Procedure			per 100 lbs deposited metal: Current Procedure		per 100 lbs deposited metal: New Procedure	
Total Cost Summary									
Pre & Post Weld Labor	220.80	$	99.60	$			$		$
Welding Labor	69.92	$	32.75	$			$		$
Total Labor	290.72	$	132.35	$			$		$
Total Electrode	5.21	$	4.89	$			$		$
Total Shielding Gas	1.40	$	0.65	$			$		$
Power	0.20	$	0.14	$			$		$
Additional Variable Expense(s)	3.00	$		$			$		$
Total Process Cost	**300.53**	$	**138.03**	$	$				$
292 **Potential Production Cost Savings**			**162.50**	$	$				
			54.1	%					%

Note : Numbers shown on this report are estimates only, any changes will modify the results

FIG. 15

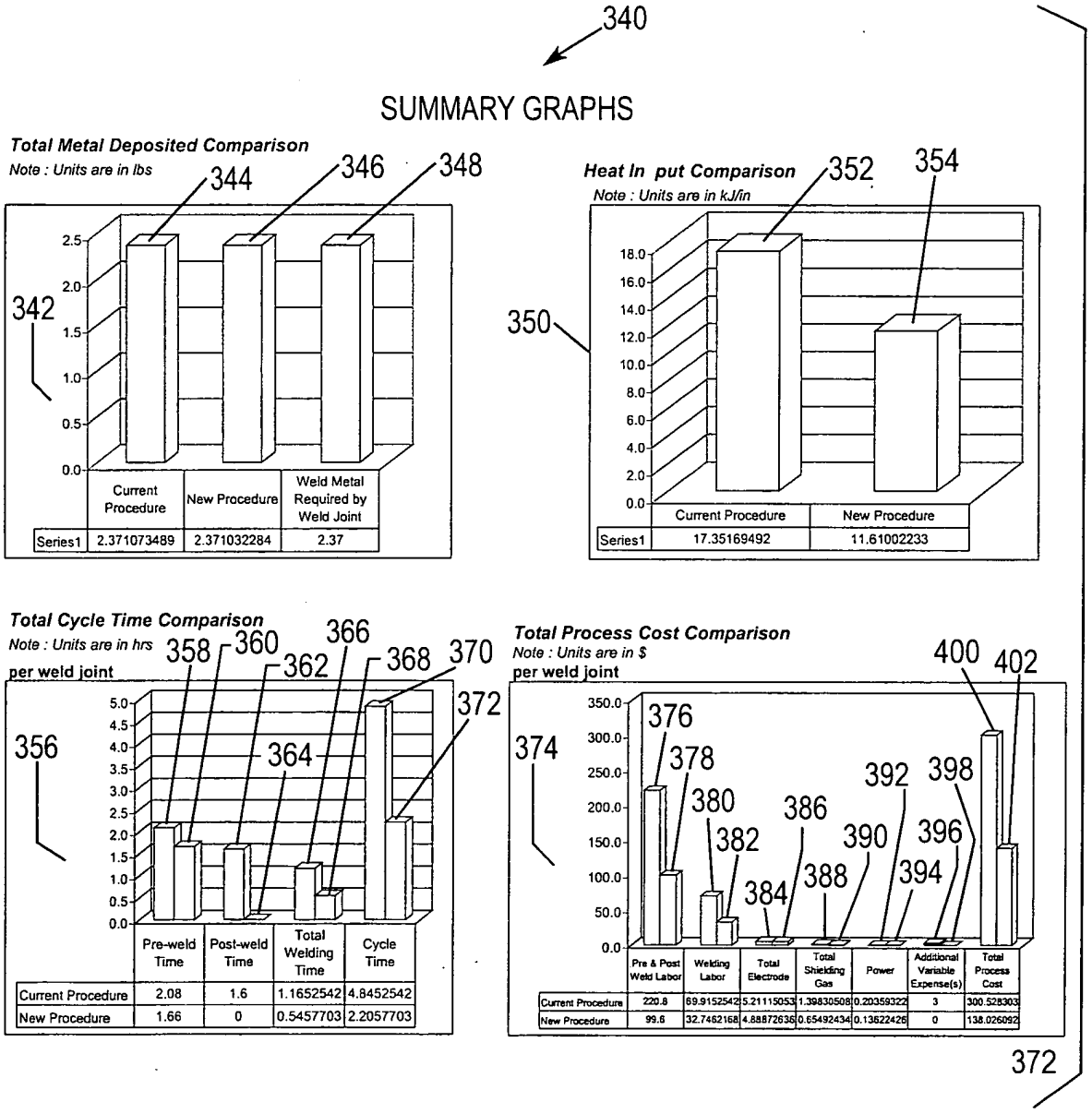

340
SUMMARY GRAPHS
Total Metal Deposited Comparison
Note : Units are in lbs
342
344
346
348
2.5
2.0
1.5
1.0
0.5
0.0
Current Procedure
New Procedure
Weld Metal Required by Weld Joint
Series1
2.371073489
2.371032284
2.37
Heat In put Comparison
Note : Units are in kJ/in
350
352
354
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Current Procedure
New Procedure
Series1
17.35169492
11.61002233
Total Cycle Time Comparison
Note : Units are in hrs
per weld joint
356
358
360
362
364
366
368
370
372
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Pre-weld Time
Post-weld Time
Total Welding Time
Cycle Time
Current Procedure
2.08
1.6
1.1652542
4.8452542
New Procedure
1.66
0
0.5457703
2.2057703
Total Process Cost Comparison
Note : Units are in $
per weld joint
374
376
378
380
382
384
386
388
390
392
394
396
398
400
402
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Pre & Post Weld Labor
Welding Labor
Total Electrode
Total Shielding Gas
Power
Additional Variable Expense(s)
Total Process Cost
Current Procedure
220.8
69.9152542
5.21115053
1.39830508
0.20359322
3
300.528303
New Procedure
99.6
32.7462168
4.88872636
0.65492434
0.13622426
0
138.026092
372

FIG. 16

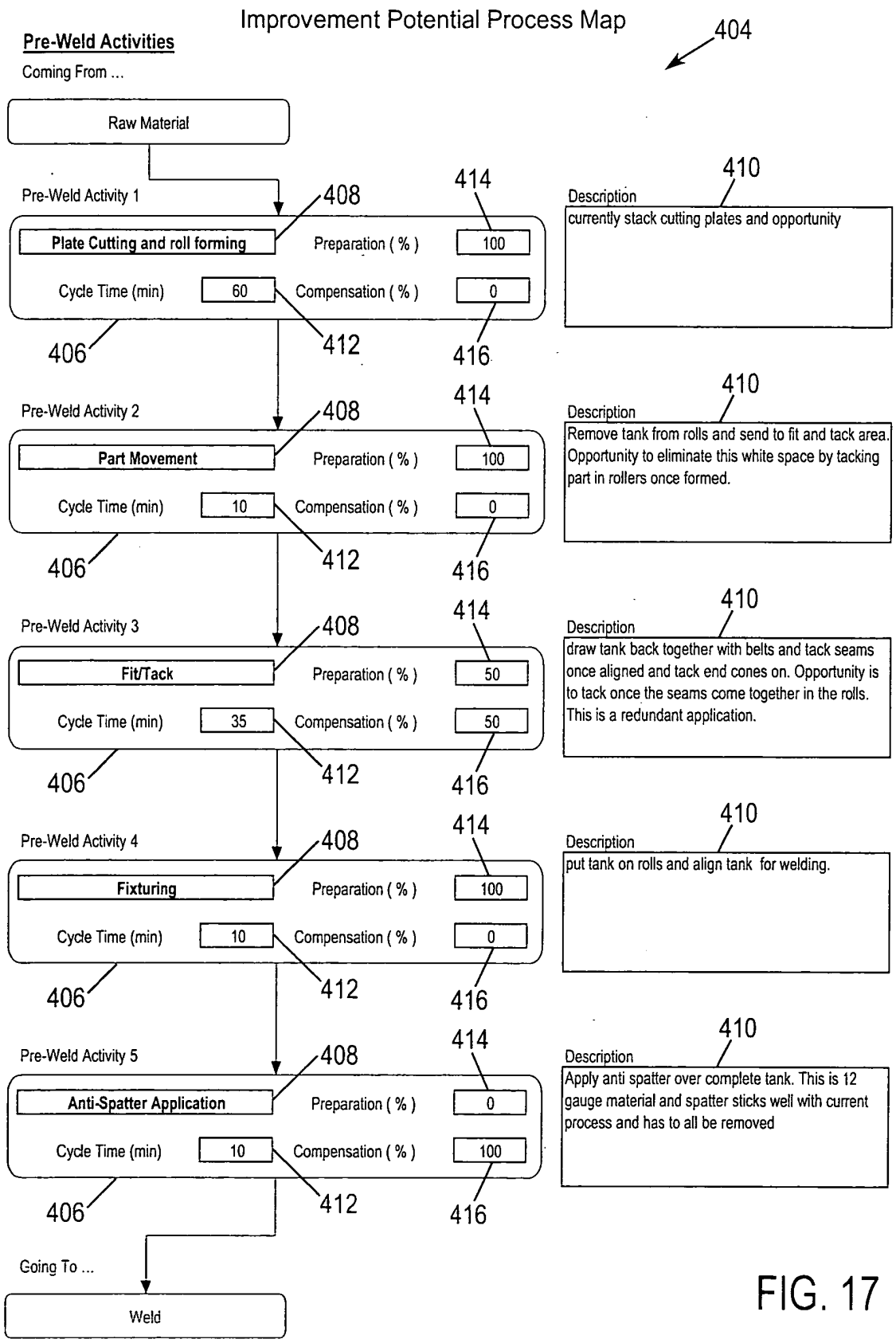
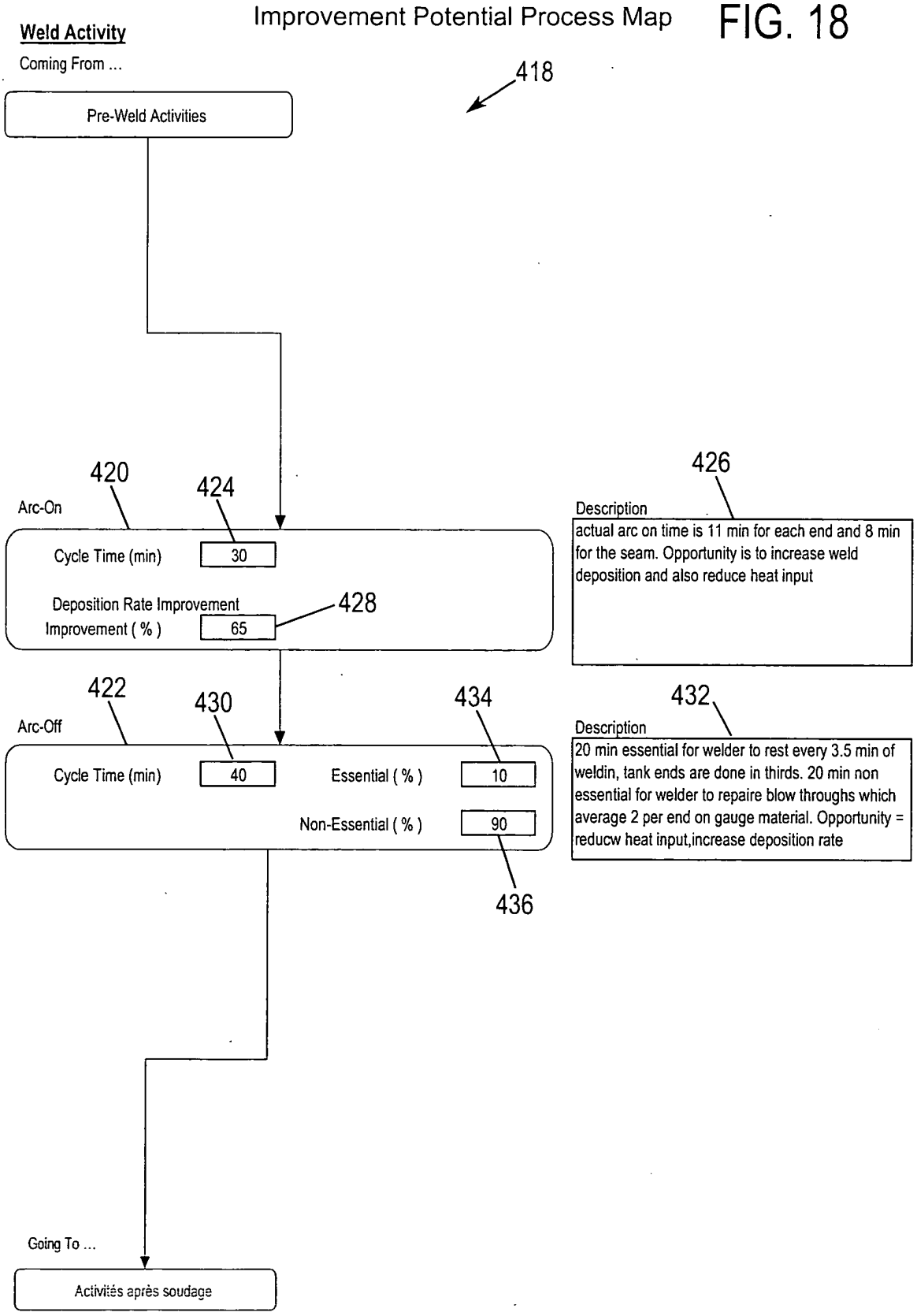

Improvement Potential Process Map
404
Pre-Weld Activities
Coming From ...
Raw Material
Pre-Weld Activity 1
408
414
410
Description
Plate Cutting and roll forming
Preparation (%)
100
currently stack cutting plates and opportunity
Cycle Time (min)
60
Compensation (%)
0
406
412
416
Pre-Weld Activity 2
Part Movement
Remove tank from rolls and send to fit and tack area. Opportunity to eliminate this white space by tacking part in rollers once formed.
Cycle Time (min)
10
Pre-Weld Activity 3
Fit/Tack
Preparation (%)
50
draw tank back together with belts and tack seams once aligned and tack end cones on. Opportunity is to tack once the seams come together in the rolls. This is a redundant application.
Cycle Time (min)
35
Compensation (%)
50
Pre-Weld Activity 4
Fixturing
put tank on rolls and align tank for welding.
Cycle Time (min)
10
Pre-Weld Activity 5
Anti-Spatter Application
Apply anti spatter over complete tank. This is 12 gauge material and spatter sticks well with current process and has to all be removed
Cycle Time (min)
10
Compensation (%)
100
Going To ...
Weld

FIG. 17

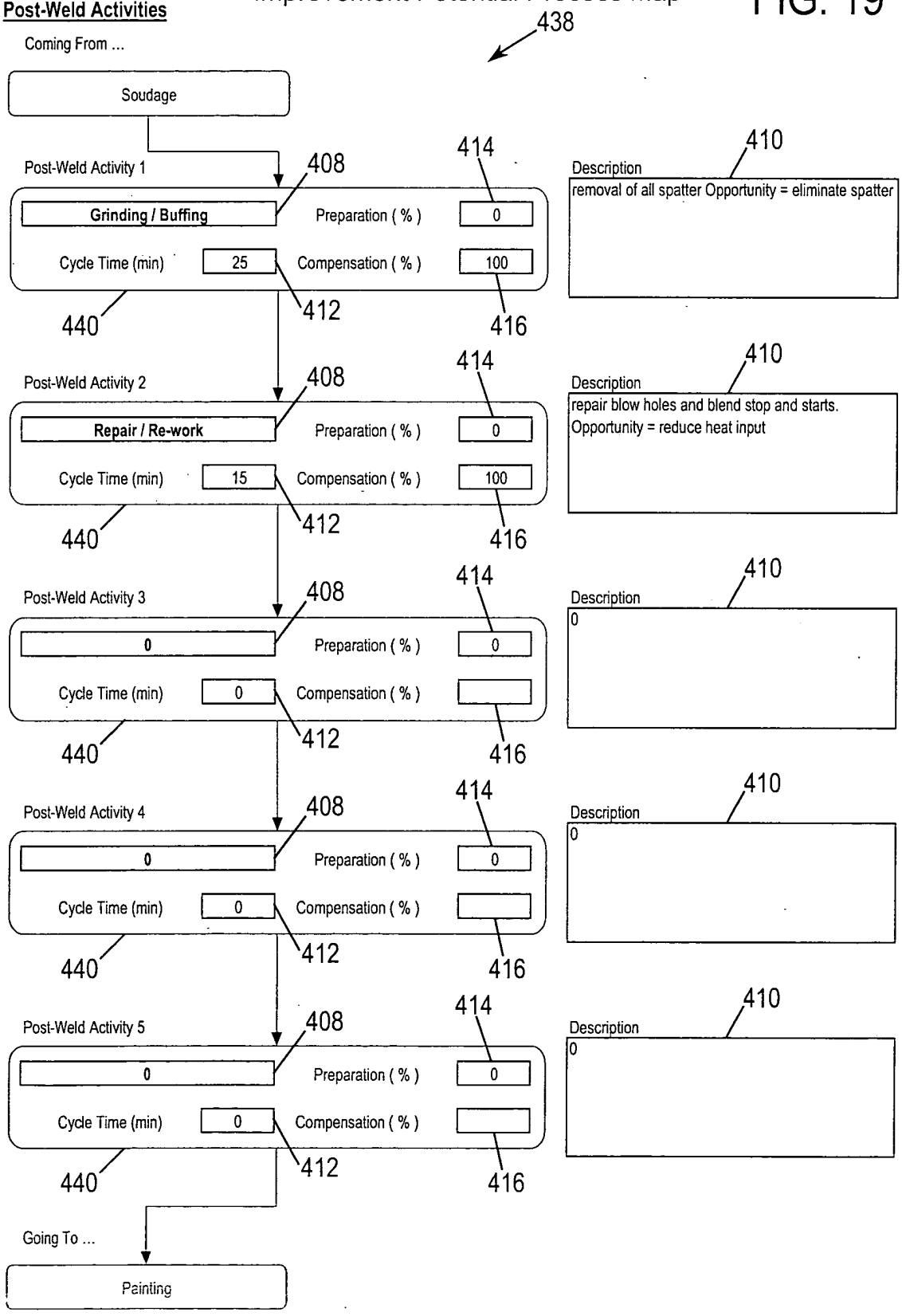
Improvement Potential Process Map

FIG. 18



Improvement Potential Process Map

FIG. 19



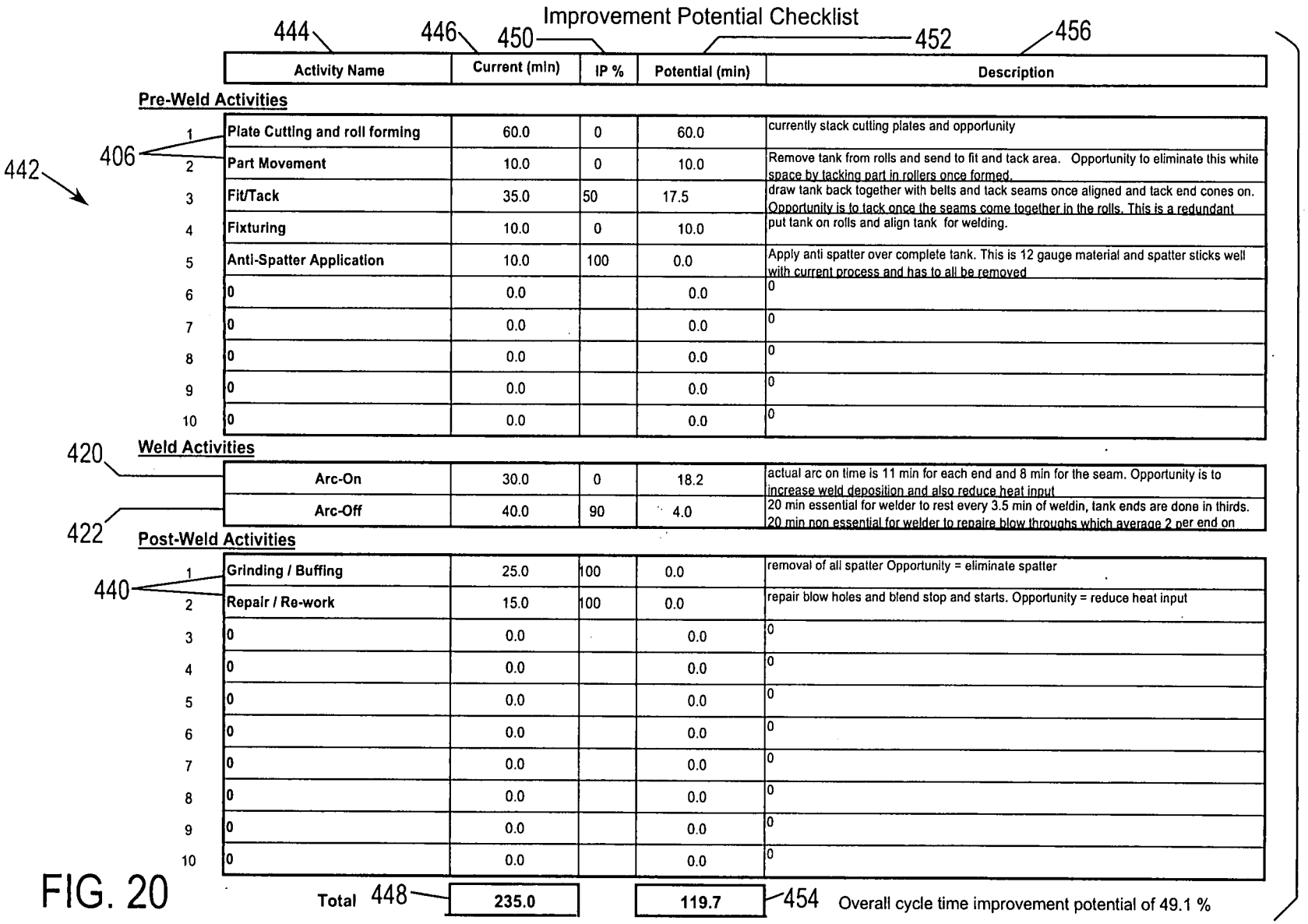

Improvement Potential Checklist
444
446
450
452
456
Activity Name
Current (min)
IP %
Potential (min)
Description
Pre-Weld Activities
406
442
1 Plate Cutting and roll forming 60.0 0 60.0 currently stack cutting plates and opportunity
2 Part Movement 10.0 0 10.0 Remove tank from rolls and send to fit and tack area. Opportunity to eliminate this white space by tacking part in rollers once formed.
3 Fit/Tack 35.0 50 17.5 draw tank back together with belts and tack seams once aligned and tack end cones on. Opportunity is to tack once the seams come together in the rolls. This is a redundant
4 Fixturing 10.0 0 10.0 put tank on rolls and align tank for welding.
5 Anti-Spatter Application 10.0 100 0.0 Apply anti spatter over complete tank. This is 12 gauge material and spatter sticks well with current process and has to all be removed
6 0 0.0 0.0 0
7 0 0.0 0.0 0
8 0 0.0 0.0 0
9 0 0.0 0.0 0
10 0 0.0 0.0 0
420
Weld Activities
Arc-On 30.0 0 18.2 actual arc on time is 11 min for each end and 8 min for the seam. Opportunity is to increase weld deposition and also reduce heat input
422
Arc-Off 40.0 90 4.0 20 min essential for welder to rest every 3.5 min of weldin, tank ends are done in thirds. 20 min non essential for welder to repaire blow throughs which average 2 per end on
Post-Weld Activities
440
1 Grinding / Buffing 25.0 100 0.0 removal of all spatter Opportunity = eliminate spatter
2 Repair / Re-work 15.0 100 0.0 repair blow holes and blend stop and starts. Opportunity = reduce heat input
3 0 0.0 0.0 0
4 0 0.0 0.0 0
5 0 0.0 0.0 0
6 0 0.0 0.0 0
7 0 0.0 0.0 0
8 0 0.0 0.0 0
9 0 0.0 0.0 0
10 0 0.0 0.0 0
Total
448
235.0
119.7
454
Overall cycle time improvement potential of 49.1 %

FIG. 20